

5 TITLE: APPARATUS AND METHOD FOR POSITIONING SEPARATELY  
SUPPLIED ELONGATE MEAT PRODUCTS

#### CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional  
10 Application No. 60/416,801, filed October 8, 2002, which  
claims foreign priority of Netherlands Application No.  
1021317, filed August 22, 2002.

#### FIELD OF THE INVENTION

15 The invention relates to a device and method for  
positioning a plurality of meat products supplied in line in  
different orientations, such as particularly sausages and  
semi-manufactures of sausages.

#### 20 BACKGROUND OF THE INVENTION

During the manufacture of meat products on industrial  
scale it is usual to transport the (half-) products between  
different processing stations by means of conveyor belts,  
conveyor chains and the like. For a relatively simple  
25 processing of the (half-) products it is advantageous when  
they are supplied in position to a subsequent processing  
station. More in particular it is advantageous when the  
elongate meat products are oriented axially in the direction  
of transport, i.e. lying successively one behind the other  
30 (with optionally greater or smaller interspacing) in  
longitudinal direction. An important limitation in the  
positioning is that the elongate meat products are usually  
vulnerable. Semi-manufactures of sausages can thus often  
have such little firmness that they deform or are damaged by  
35 local contact. It will be apparent that damage and  
deformation of the meat products is undesirable.

5        Such a positioning is known from, among others, EP 0  
456 155 in which a device is described for transporting and  
packaging sausages. Described on the basis of the figures of  
this patent publication are means for axially positioning  
the sausages. These means are formed by a pair of plates  
10 placed above a feed conveyor for the sausages. The plates  
are disposed vertically at an angle such that they together  
form a mouth opening through which the sausages are  
discharged. The plates serve to press the sausages not  
supplied axially relative to the mouth opening into the  
15 desired orientation. Such a construction with positioning  
plates is structurally very simple but has the drawback that  
the contact between the plates and the (half-) products can  
result in undesired effects. Soft sausages can thus be  
deformed, meat remnants can remain on the plates, leading to  
20 contamination, and sausages lying too close together can be  
pressed together.

      The plates form a potential source of blockages.  
Another significant drawback is that the sausages according  
to this prior art are not always brought into the desired  
25 orientation; the sausages are found in practice to also  
assume orientations differing from the axial.

      The invention has for its object to provide a device  
and a method with which meat products can be oriented in a  
controlled manner, wherein the above stated drawbacks of the  
30 prior art do not occur, or only do so to a lesser extent.

      These and other objects will be apparent to those  
skilled in the art.

#### SUMMARY OF THE INVENTION

35        The invention provides for this purpose a device for  
positioning separately supplied elongate meat products,  
comprising: two driven endless aligning conveyors running

5 with the transport paths substantially parallel to each other, which transport paths together form a support for the meat products for transporting such that, at the position where the transport paths are mutually adjacent, they are in a lower position than when at a greater mutual distance. The  
10 form of the contact surface with which the meat products come into contact (this contact surface being formed by the combined form of the aligning conveyors) results in the meat products displacing to the lowest possible position, which has the form of a chute created by the aligning conveyors.  
15 Through displacement to the lowest possible position (for instance by means of sliding, rolling or a combination hereof), the meat products, depending on the specific processing conditions, will already largely assume a successive axial orientation. The advantage of the device  
20 according to the invention is that the meat products do not undergo any forced movement herein, but take on the desired orientation only by means of gravitational force. This limits the chance of damage to the meat products and contamination of the transporting and positioning means. An  
25 advantage of using two aligning conveyors running partially parallel is that individually they can have a simple construction, while together they still provide the desired "conveyor chute". An endless conveyor with a conveyor surface of complex form requires solutions which are  
30 structurally much more difficult. Another advantage here is that this "conveyor chute" can be opened on the underside, so that possible contaminants such as loose meat portions can be discharged downward through the chute. In order to prevent the meat products themselves also being able to fall  
35 downward in uncontrolled manner between the individual aligning conveyors, the distance between the aligning conveyors is preferably smaller than the smallest diameter

5 perpendicularly of the longitudinal axis 30 through the elongate meat products.

#### DESCRIPTION OF THE DRAWINGS

Figure 1 shows a perspective view of a part of a  
10 crimper wheel with a conveyor belt 5 connecting thereto with which sausages are discharged according to the prior art;

Figure 2 shows a perspective view of a part of the device according to the invention

Figure 3 shows a top view of the device according to  
15 the invention; and

Figure 4 shows a view of a cross-section through the device according to figure 3.

#### DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

20 In a preferred embodiment of the device according to the present invention, the aligning conveyors are constructed from a plurality of substantially form-retaining segments which are fixed to an endless support member. A simple endless conveyor belt or conveyor chain can thus be  
25 provided with separate segments which can have any desired form. The freedom in designing the conveyor chute formed by the aligning conveyors together is very great here, without complex constructions being required to drive or bring about circulation of the individual aligning conveyors.

30 In yet another preferred embodiment the device also comprises a discharge conveyor located at least partially under the transport paths of the aligning conveyors. After running through the transport path provided by the aligning conveyors, the meat products positioned by the aligning  
35 conveyors can thus be transferred simply to a subsequent conveyor, such as for instance a traditional conveyor belt,

5 without having to be gripped, with all the drawbacks this entails.

The device can also comprise a feed member for elongate meat products which is located partially above the transport paths of the aligning conveyors. Due to the gravitational  
10 force the meat products for positioning can hereby be delivered in simple manner into the conveyor chute formed by the aligning conveyors. Gripping by external means is once again unnecessary here. An example of a feed member is a so-called crimper wheel with which a strand of sausages can be  
15 divided into separate sausages. A problem with the existing crimper wheels is that the separate sausages that are released do not all have the same orientation; this problem can be solved by means of the present invention.

A very advantageous embodiment variant of the device  
20 comprises aligning conveyors driven such that they are displaceable with a difference in speed. This can for instance be realized by applying separate motors for both the aligning conveyors, but it is also possible to apply a common drive engaging on both the aligning conveyors with  
25 two different transmissions. The important advantage of a difference in speed is that, due to the form of the conveyor chute, meat products which are not yet positioned axially (for instance sausages lying transversely of the direction of transport) will still take on the desired axial  
30 orientation owing to the difference in speed.

It is also advantageous when the transport paths of the aligning conveyors have a path section running substantially parallel to each other which transposes into a path section where the distance between the transport paths increases in  
35 the direction of transport. The meat products can thus drop downward between the aligning conveyors, provided that the mutual distance between the aligning conveyors increases

5 sufficiently for this purpose. This provides the option of  
transferring the meat products in very controlled manner  
onto a lay-off means (such as for instance the above stated  
discharge conveyor) arranged under the aligning conveyors.  
Discharging of the positioned meat products between the  
10 aligning conveyors moreover forms an extra guarantee of  
axial positioning of the meat products.

The invention also provides a method for positioning  
separately supplied elongate meat products by the successive  
steps of: a) collecting successively supplied elongate meat  
15 products from a supply position by means of two aligning  
conveyors running with the transport paths substantially  
parallel to each other, b) displacing the aligning conveyors  
with the meat products supported thereby in the direction of  
transport, and c) unloading the positioned elongate meat  
20 products from the aligning conveyors through an opening  
between the transport paths of the aligning conveyors, which  
opening increases in the direction of transport. The  
advantages as already described above with reference to the  
device according to the present invention can be realized by  
25 means of this method. In a preferred application of this  
method the transport paths of the aligning conveyors, owing  
to the form thereof, guide the meat products during  
processing step a) to a preferred orientation in axial  
direction. Without exerting external forces other than  
30 gravity, the meat products will thus position themselves in  
unforced manner. This is also possible during processing  
step b) when the transport paths of the aligning conveyors,  
owing to the form thereof, guide the meat products to a  
preferred orientation in axial direction during displacing  
35 of the meat products. When the aligning conveyors are also  
displaced at different speeds during processing step b), the  
aligning conveyors will exert limited external forces on the

5 meat products in order to ensure the desired orientation,  
although also in this case the meat product can displace in  
unforced manner. Tests have shown that the difference in  
speed with which the aligning conveyors are displaced  
preferably amounts to less than 10% of the speed of the  
10 fastest-moving aligning conveyor.

For unforced unloading of the meat products the meat  
products can, in a preferred application, preferably be  
unloaded during processing step c) in that they drop  
downward between the two aligning conveyors.

15 Figure 1 shows a part of a crimper wheel 1 with which a  
strand of sausages (not shown) is divided up into separate  
sausages 2. Sausages 2 are laid off onto a flat endless  
conveyor 3 by crimper wheel 1. A part of transport path 4  
and a part of return path 5 of conveyor 3 are shown. As will  
20 be apparent from the illustration, sausages 2 are placed on  
conveyor 3 in rather random manner. It is however an object  
of the invention to place such sausages 2 on conveyor 3 one  
behind the other and axially relative to the direction of  
transport of conveyor 3.

25 Figure 2 shows a part of a device 6 provided with two  
endless aligning conveyors 7, 8. Aligning conveyors 7, 8  
both comprise an endless chain 9, 10 to which are fixed  
form-retaining and downward inclining segments 11. Transport  
paths 12, 13 of aligning conveyors 7, 8 run practically  
30 parallel to each other over a distance and thus form a kind  
of chute in which the meat products for positioning can be  
placed by a crimper wheel 1. During displacement of aligning  
conveyors 7, 8 the meat products will take on the desired  
orientation, whereafter they are laid off onto a discharge  
35 conveyor 14 co-displacing under transport paths 12, 13 of  
aligning conveyors 7, 8. Two rotation shafts 15, 16 of the

5    respective endless aligning conveyors 7, 8 are also shown in  
this figure.

Figure 3 shows device 6 in cross-section. A frame 17  
carries a spindle 19 coupled to the frame with a bolt 18.  
Engaging on spindle 19 are bearings 20 which engage  
10    internally on a rotatable bush 21 which forms the guide for  
endless chain 10 of aligning conveyor 8. Right-angled  
brackets 22 are fixed to chain 10, which brackets carry the  
segments 11 fastened with a bolt connection 23. The aligning  
conveyor 8 is thus guided round spindle 19 by bush 21.  
15    Device 6 is screened from the environment by means of a grid  
plate 24; this serves to prevent, among other things, injury  
and malfunction. Toothed wheels 26, 27 synchronize the  
speeds of the two conveyors 7, 8. As already described above  
however, synchronization is not always desired; in specific  
20    conditions it is precisely a limited difference in  
transporting speed of the respective aligning conveyors 7, 8  
which is sought. When a speed difference is aimed for, the  
mutual coupling of aligning conveyors 7, 8 will be absent or  
have a different transmission ratio. Owing to toothed wheels  
25    26, 27 a single electric motor 28 will suffice in the shown  
example to drive the aligning conveyor 7.

It can be clearly seen that segments 11 of both  
aligning conveyors 7, 8 together form a chute in which the  
meat products 29, here shown schematically, can be  
30    transported.

Finally, figure 4 shows device 1 in a top view.  
Aligning conveyor 8 is wholly the same as the first aligning  
conveyor 7, be it in a mirrored configuration. Transport  
paths 12, 13 of aligning conveyors 7, 8 run parallel to each  
35    other and thus form the above discussed chute-like  
construction. Lay-off paths 35, 36 connecting hereto are  
characterized in that



5 the aligning conveyors 7, 8 have a continually increasing  
mutual distance in the direction of transport. The space  
hereby created between segments 11 makes the meat products  
drop downward between segments 11 to fall for instance onto  
a discharge conveyor 14 as shown in figure 2. It can also be  
10 seen that tensioners 37, 38 are arranged to hold the  
aligning conveyors 7, 8 tensioned.

It is therefore seen that this invention will achieve  
its stated objectives.